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(54) **Dictation apparatus that is a combination of a portable computer and a hand set.**

(57) The combination of a portable computer and hand set for the purpose of achieving dictation has been conceived. The hand set has a digital signal processor that compresses voice samples after voice signals have been converted from analog to digital. The digital signal processor is connected to a serial communication link through which communication can be held directly with a portable computer. Both voice samples and control data are carried by the communication same link. Controls are provided in the hand set for carrying out the normal dictation operations.

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This invention resides in the field of voice processing and more specifically is directed to dictation equipment that is portable or of the desk top and hand held variety. There are many systems for voice processing wherein a message is recorded and subsequently played back as required. Included in such voice processing systems are telephone answering machines, loggers, dictation equipment and the like. The instant invention is directed to dictation equipment and particularly to portable dictation equipment whereby dictation can be accomplished at any location with equipment that provides convenience in addition to mobility. More specifically, it would be advantages for an owner of a lap top or hand held computer to be able to use the same for dictation.

A large number of hand held, self contained dictation units are known, as for example Dictaphone Corp. model no. 1253. In addition, there are desk top dictation units, such as Dictaphone Corp. model no. ECXII. Although these systems work well for their intended purpose, it would be desirable to be able to use a portable computer, such as a lap top or palm top computer for the purpose of voice processing. The advantage to using such a computer in the field of voice processing is that of convenience as well as tighter integration of voice and data, such as voice annotation and the like.

There are presently different types of equipment that provide dictation capability to a computer. These units require the use of a smart card that is inserted into the computer for accomplishing dictation. A hand microphone is provided which sends analogue voice signals that are converted by the smart card to digital signals. With such prior units, the keyboard is used for control purposes. It clearly would be advantageous to have a combination portable computer and hand set which no disk, tape and card or the like is required and one in which control is through the hand set in the standard manner. In addition, lap top computers do not have the size that allows the convenient reception of smart cards.

A portable dictation system has been conceived that is a combination of a portable computer and a hand set. The portable computer can be any personal computer, but it has particular utility in a lap top computer or a palm type computer. The hand set is attachable to the computer and has a digital signal processor therein that converts analogue voice signals to digital samples and compresses the digital voice samples to reduce storage and transmission requirements. A microphone in the hand set receives analogue voice which is then sampled by the analog to digital converter which delivers digital voice samples to the digital samples processor for compression.

The processor of the computer receives the compressed voice samples and stores such data in its memory. Upon completion of a dictation session, the hand set can be disconnected and the computer can

be used for other purposes. When further dictation is to be carried out, or messages stored in the memory of the computer are to be transcribed, the hand set can be reconnected to the computer for the purpose of either additional dictation or receiving the stored voice signals. Controls are provided in the hand set to actuate the voice samples from the computer which are then expanded by the digital signal processor, converted from digital to analog and then sent over a speaker to be heard by the operator.

The above is performed without the need of an item such as a smart card being inserted into the computer. Only a port, such as a RS232 serial port, need be provided to the computer.

The invention will be better understood from the following non-limiting description of an example thereof given with reference to the accompanying drawings in which:-

FIG 1 is a block diagram showing the combination of a computer and hand set in which the invention can be carried out,

FIG 2 is a plan view of a hand set shown in FIG 1, and

FIG 3 is a flow chart showing the steps of the processing with the upper portion showing the information flow within the hand set, and the lower portion showing the information flow within the computer.

With reference to FIG 1, a block diagram of a combination portable computer and hand set is shown generally at 10 that illustrates the combination of a portable computer and a hand set in which the instant invention may be practiced. The handset has a housing 12 with a microphone 14 contained therein. The microphone 14 is in communication with an amplifier 16 which in turn is in communication with an analog to digital (A/D) converter 18. A digital signal processor 20 is received within the housing and is in communication with the A/D converter 18. The digital signal processor 20 can be a typical of the shelf DSP hardware that are operative to compress data, as for example from 64 to 4.8 kilobits per second. An example of a processor 20 that can be used as a digital signal processor is a model C5X processor family available from Texas instruments, Dallas, Texas. Such a processor can be programmed to perform functions such as speed up and slow down of voice without pitch distortion, automatic gain control (AGC) and voice recognition as desired.

The digital signal processor 20 is in communication with a controller 22 that includes a panel 24, and has the normal operating features such as record 23, replay speaker 25, stop 27, playback 29, fast forward 31, volume control 33 and the like that are associated with dictation equipment as seen in FIG 2.

A battery (not shown) provides the power for the hand set 24. In communication with the digital signal processor 20 is an RS232 serial port 28 to which a

lead 30 can be connected. In communication with the processor 20 is an analogue to digital (A/D) converter 44. An amplifier 46 is in connection with the D/A converter 44 and is in turn in connection with the speaker 25.

An RS232 port 32 is in communication the processor 36 of the computer 34 and is operative to receive the connector portion 35 of the lead 30. Also included in the computer 34 is a memory 38 for storage of the operating instructions and data. The processor 36 is in communication with a keyboard 39 and a display 41. Needless to say, the portable computer can be one of a number of commercially available computers such as a Compaq lap top computer model LTEL light/25, a DEL 380 lap top computer and an NCR computer model 3170.

With particular reference to FIG 2, details of the controls for the hand set will be described. The hand set includes the combination speaker 25/microphone 14 and LEDs to indicate when the system is enabled 48, when recording is taking place 49 and when playback is occurring 50. On the side of the microphone is a volume control 33 and a speed up, slow down control 51 on the opposite side. An end button 53 is provided to indicate when the end of a dictation session is achieved, the fast forward button 31, for the purpose of scanning through digital speech, and an impression button 55 which is used to mark a spot for fast identification. Adjacent to these buttons is a lock button 57 which locks the system in the recording mode, and the record button 23 that serves the purpose of enabling the recording session. Below these is a stop button 27 for the purpose of stopping the fast forward and the rewind button 29 that skips backward through the dictation. Secured to the hand set is a pair of wires 28 which serve as the RS232 link.

With reference to FIG 3 a general description will be given of the system processing. Initially, information is input 52 through the microphone 14. This information is encoded 54 which involves sampling of the incoming analog signal, compression of the digitized signals automatic gain control, speed control and the like. The protocol is then carried out 56 for transmission over the communication link 30. Both speech data and control data are transmitted on the same line 30. In the computer processor 36, communications handling takes place 58 and the dictation application is achieved 60. After the dictation application is carried out, it is stored in the memory 38 and the storage address is produced on the computer monitor. In order to recover speech data, the panel controls 24 are operated to enable playback 29 and the controller 22 communicates with the data communications protocol 56 for the purpose of initiating a recall operation. Once more, the communication handler 58 retrieves from the memory 38 the information that is sought. The data then goes from the memory 38 through the interrupt handler through the protocol 56

is decoded and eventually output on the speaker 48.

In operation, the hand held device 12 and the portable computer 34 would be placed in communication with one another by connection of the lead 30 into the RS232 serial port 32 of the computer 34, and the hand set 12 is operated in much the same conventional manner as any other hand set attached to the base of a dictation equipment. The primary difference is that the capability for voice compression is housed in the hand set as opposed to being in the base of dictation equipment. With this arrangement, both control data as well as digitized voice data is transmitted on the same line 30. More specifically, the operator enters a file name through the keyboard 39 of the computer to identify the speech segment. The operator then will press the record button 23 on the panel 24 and speak through the microphone 14. The voice signals will be amplified by the amplifier 16 and sampled by the A/D converter 18. The digital signal will then be compressed by the digital signal processor 20, as for example, from 64 kilobits per second to 4.8 kilobits per second. The rate is not critical to the instant invention so long as its a low rate with good sound quality. The compressed digital voice samples are then sent to the processor 36 which receives the same and stores the data in the memory 38. At this point, the hand set 12 may be disconnected from RS232 port 32 and the portable computer 34 can be used for other purposes. When one wishes to retrieve the stored voice message then the hand set 12 will be connected once more to the portable computer 34 through the RS232 ports 32, the speech portion will be identified by entering the appropriate file name through the keyboard 39 and the speaker function of the hand set will be operated. More specifically, the reverse/playback button 29 on the panel 24 will be activated and digital data will be transferred from the memory 38 to the processor 36 through the RS232 ports 20-32 to be expanded by the digital signal processor 20 of the hand set 12. The data will then be sent to the D/A converter 44, onto the amplifier 46 and received by the speaker 48 to be received by the operator. At this point, the message can be either listened to or transcribed.

Thus, what has been shown and described is a combination hand set 12 and portable computer 42, wherein direct communication can be held between a hand set and a portable computer without need of a storage disk, extra internal hardware or the like being received or located within the computer 42 and without total reliance upon keyboard entry.

The above embodiments have been given by way of illustration only, and other embodiments of the instant invention will be apparent to those skilled in the art from consideration of the detailed description.

Claims

1. Dictation apparatus, comprising:
 - a.) a computer having a first processor, and a memory in communication with said processor, 5
 - b.) a hand set having a microphone, a digital to analogue converter in communication with said microphone and a digital signal processor in communication with said analogue to digital converter, and 10
 - c.) a communication link between said first processor and said digital signal processor.
2. The dictation apparatus of Claim 1 further including said hand set having a digital to analogue converter in communication with said digital signal processor and a speaker in communication with said digital to analogue converter. 15
3. The dictation apparatus of Claim 2 wherein said hand set further includes an amplifier between said analogue to digital converter and an amplifier between said analogue to digital converter and said speaker. 20
4. The dictation apparatus of Claim 3 wherein said communication link further includes said portable computer further having an RS232 serial port in communication with said first processor and said hand set has an RS232 serial port in communication with said digital signal processor. 25
5. The dictation apparatus of Claim 4 wherein said communication link further includes a lead connected at ends each of its ends to one of said RS232 serial ports. 30
6. The dictation apparatus of Claim 5 wherein said portable computer further includes a display and a keyboard. 35
7. A hand set for connection with a computer to define a dictation apparatus, comprising:
 - a.) a microphone, 40
 - b.) a digital to analogue converter in communication with said microphone,
 - c.) a digital signal processor in communication with said analogue to digital converter, and 45
 - d.) a communication port in communication with said digital signal processor. 50
8. The hand set of Claim 7 further including a digital to analogue converter in communication with said digital signal processor and a speaker in communication with said digital to analogue converter. 55
9. The hand set of Claim 8 further including an amplifier between said analogue to digital converter and an amplifier between said analogue to digital converter and said speaker.
10. The hand set of Claim 9 wherein said communication port is an RS232 serial port.

FIG. 1

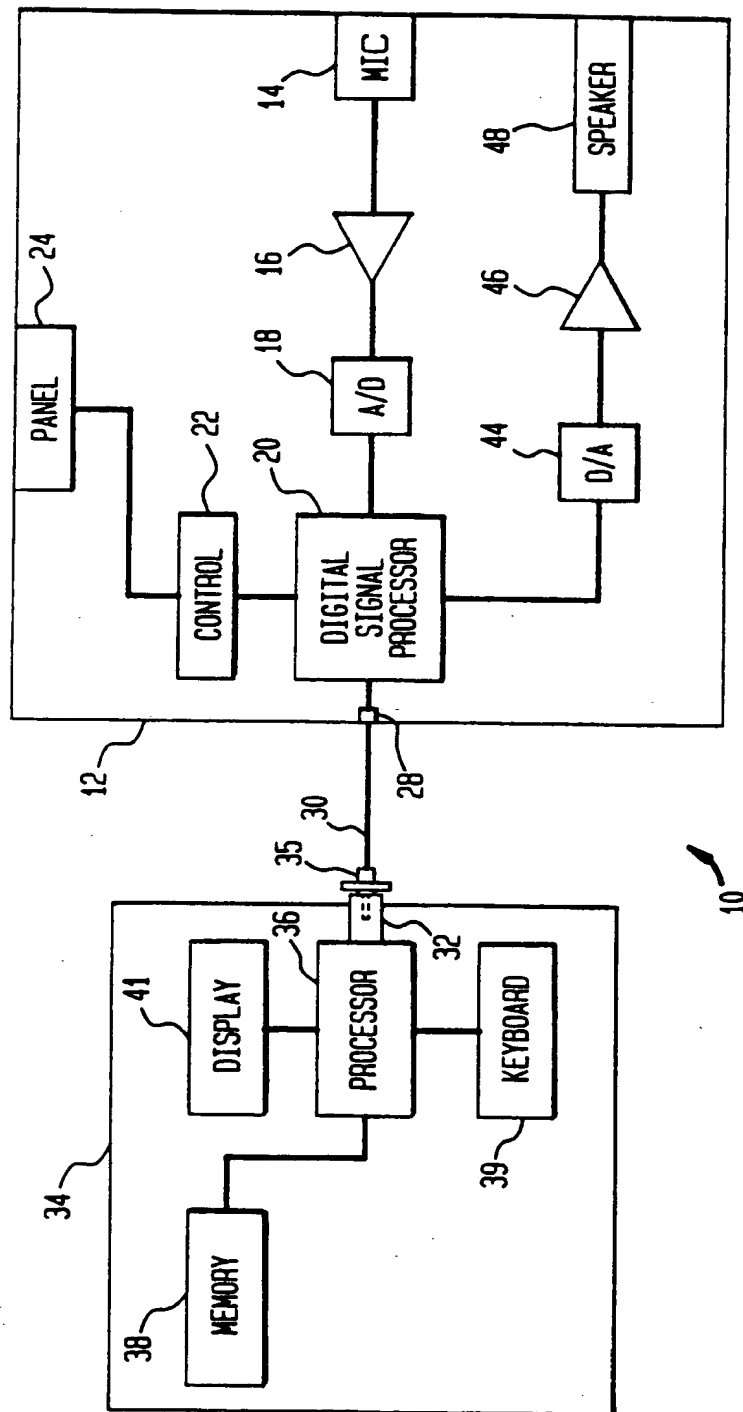


FIG. 2

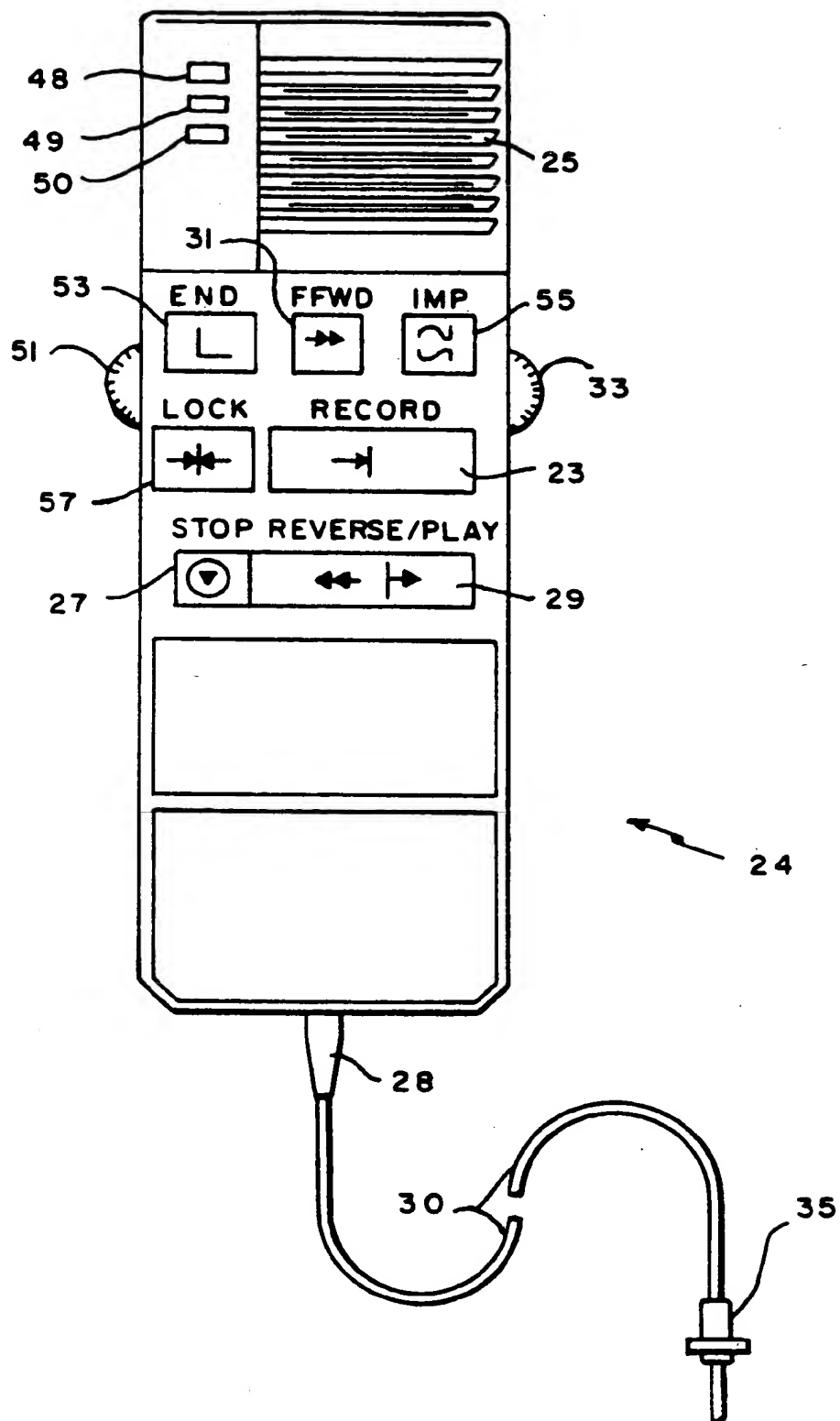
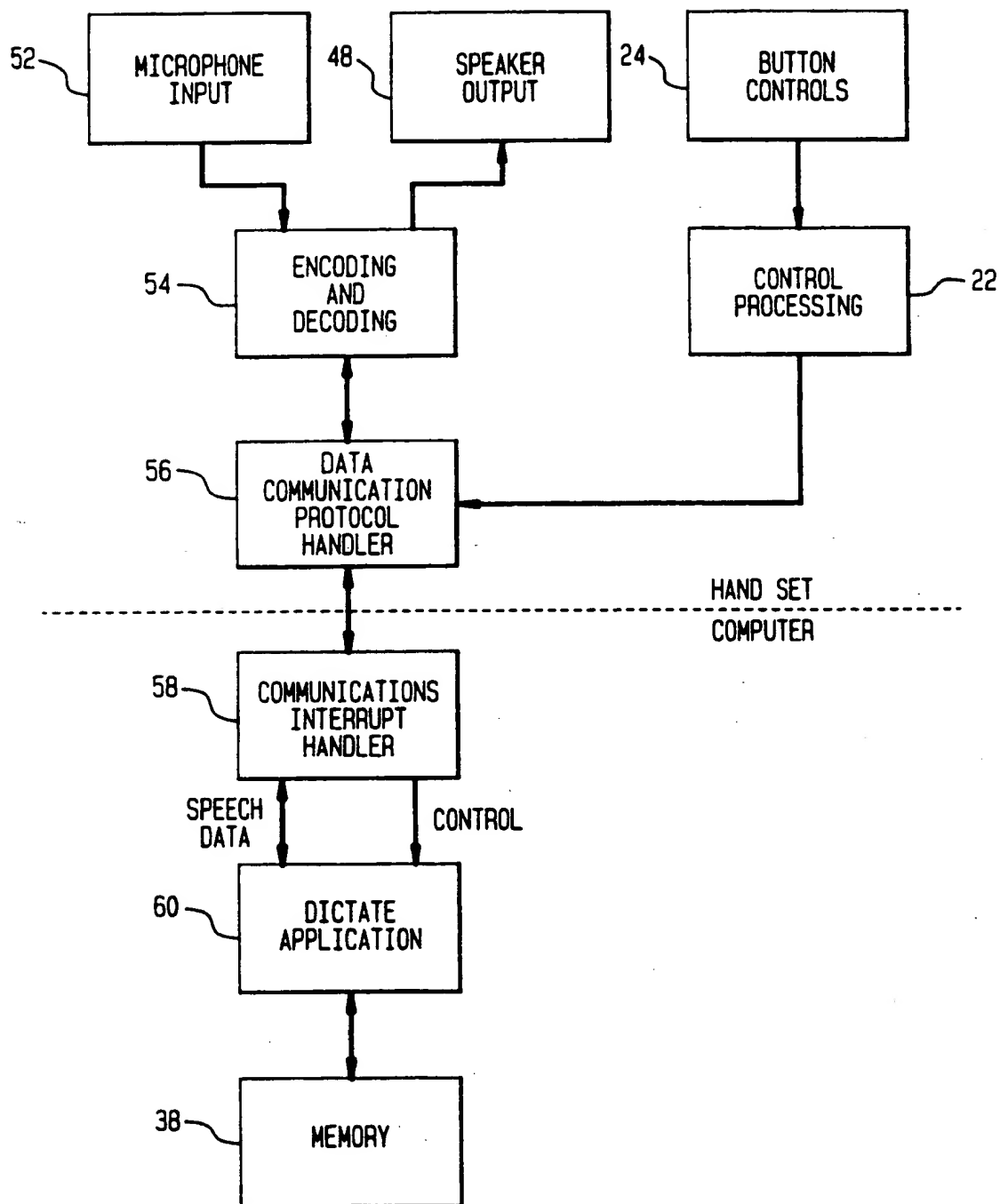


FIG. 3





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 31 0427

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	US-A-5 036 539 (WRENCH, JR ET AL.) * column 2, line 18 - line 34 * * column 4, line 40 - column 5, line 36; figures 1,2 *	1-3,7-9	G06F3/16
X	EP-A-0 505 304 (INTERNATIONAL BUSINESS MACHINES CORPORATION) * column 6, line 33 - column 7, line 10; figure 2 *	1-10	
A	DE-A-39 27 234 (GRUNDIG) * column 3, line 66 - column 4, line 19 * * column 5, line 21 - line 39; figure 1 *	1-10	
A	ELEKTRONIK vol. 37, no. 22 , 28 October 1988 , MUNCHEN DE pages 126 - 130 XP111741 BRENNER 'SPRACHAUSGABE-SYSTEM MIT MINIMALEM AUFWAND REALISIEREN' * page 130, left column, line 3 - right column, line 37; figures 1,2 *	1-10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			G06F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 11 April 1994	Examiner Nygren, P
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure F : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons @ : member of the same patent family, corresponding document</p>			

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